University of Tikrit

College of nursing

Basic Nursing Sciences

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Parasitology

Enterobius vermicularis

By:

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-*Enterobius vermicularis*

Common name: PIN worm or thread worm.

Habitat: Adult worm inhabit the caecum, appendix and adjacent portions of the ascending colon.

Morphology:

Enterobius vermicularis is a small white worm with thread-like appearance. The worm causes enterobiasis. Infection is common in children.

Male: The male measures 5 cm in length. The posterior end is curved and carries a single copulatory spicule.

Female: The female measures 13 cm in length. The posterior end is straight.

Egg: The eggs are colourless and flattened on one side. They are surrounded by a thin, smooth , transparent shell and usually contain fully developed larvae.

Infective stage: Embryonated egg .

Infection is by ingestion of eggs containing larvae with contaminated raw vegetables. Diagnostic stage: Unembryonated egg.

Mode of infection:

• By direct infection from a patient (Fecal-oral route).

• Autoinfection: the eggs are infective as soon as they are passed by the female worm. If the hands of the patient get contaminated with these eggs, he/she will infect him/herself again and again.

• Aerosol inhalation from contaminated sheets and dust. Clinical

presentation:

The migration of the worms causes allergic reactions around the anus and during night it causes nocturnal itching (pruritus ani) and enuresis. The worms may obstruct the appendix causing appendicitis.

Diagnosis:

♦ Eggs in stool: Examination of the stool by direct saline smear to detect the egg: this is positive in about 5% of cases because the eggs are glued to the peri-anal skin.

♦ Peri-anal swab: The peri-anal region is swabbed with a piece of adhesive tape (cellotape) hold over a tongue depressor. The adhesive tape is placed on a glass slide and examined for eggs. The swab should be done in the early morning before bathing and defecation.

Treatment: Mebendazole; Piperazine. Life cycle:
Adult worm lives in the large intestine. After fertilization, the male dies and the female moves out through the anus to glue its eggs on the peri-anal skin. This takes place by night. The egg is 50x25 microns, plano-convex and contains larva. When the eggs are swallowed, they hatch in the small intestine and the larvae migrate to the large intestine to becomeadult.

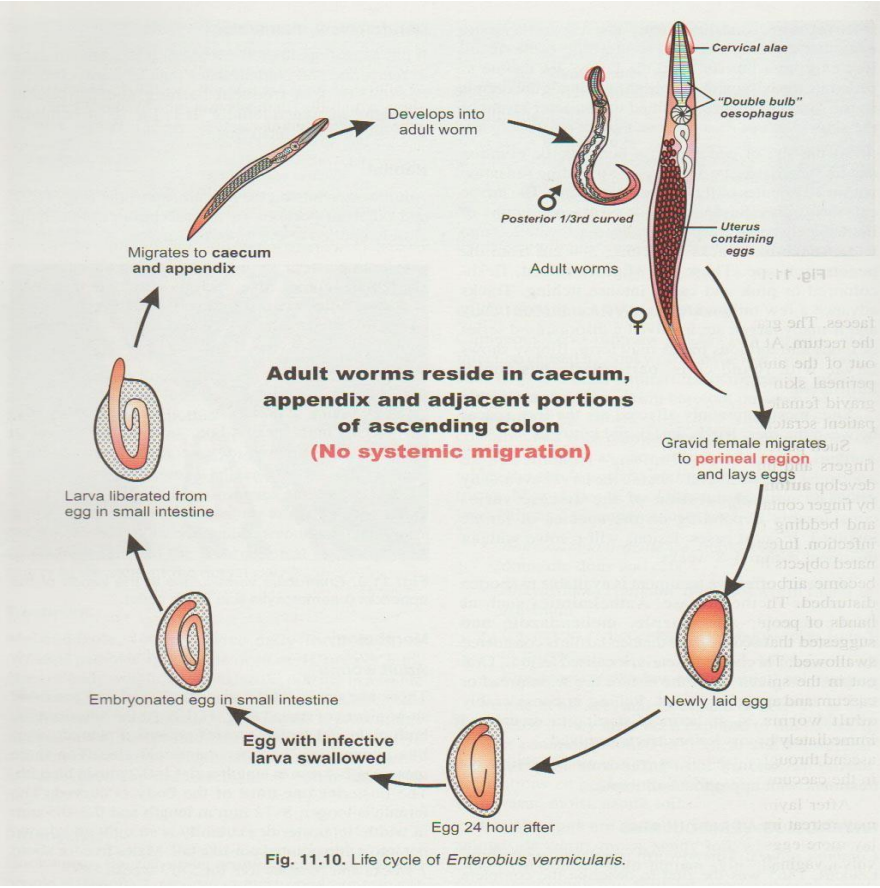

Fig. 11.10. Life cycle of *Enterobius vermicularis*.

Life cycle of *Enterobius vermicularis*

1. *Trichuris trichura*

Common name: Whip worm.

Habitat: *T. trichura* lives in the large intestine. Particularly in the caecum .

The worm is divided into a thin whip-like anterior part measuring 3/5 of the worm and a thick fleshy posterior part of 2/5 the length.

Male: The male measures 3-4.5 cm in length. Its posterior end is coiled and possesses a single cubicle.

Female: The female measures 4-5 cm in length. Its posterior end is straight.

Egg: Egg is barrel shaped with clear , mucoid- appearing polar plugs at each end. Infective stage: Eggs containing larvae (embryonated egg).

Diagnostic stage: Unembryonated egg.

Mode of infection: Man acquires infection by embryonated eggs whith contaminated food or water.

Symptoms:

The patient complains of dysentery (blood and mucus in stool together with tenesmus). Rectal prolapse is also possible.

Diagnosis:

Demonstration of characteristic eggs. The egg of *trichuris* is barrel-shape. with a mucous plug at each pole.

Treatment: Mebendazole: 1 tablet twice daily for 2 days. Life cycle:
Ingested eggs hatch in the small intestine and the larvae migrate to the large intestine to become adult. After mating, the female lays immature eggs, which pass with the stool to the soil and mature in 2 weeks.

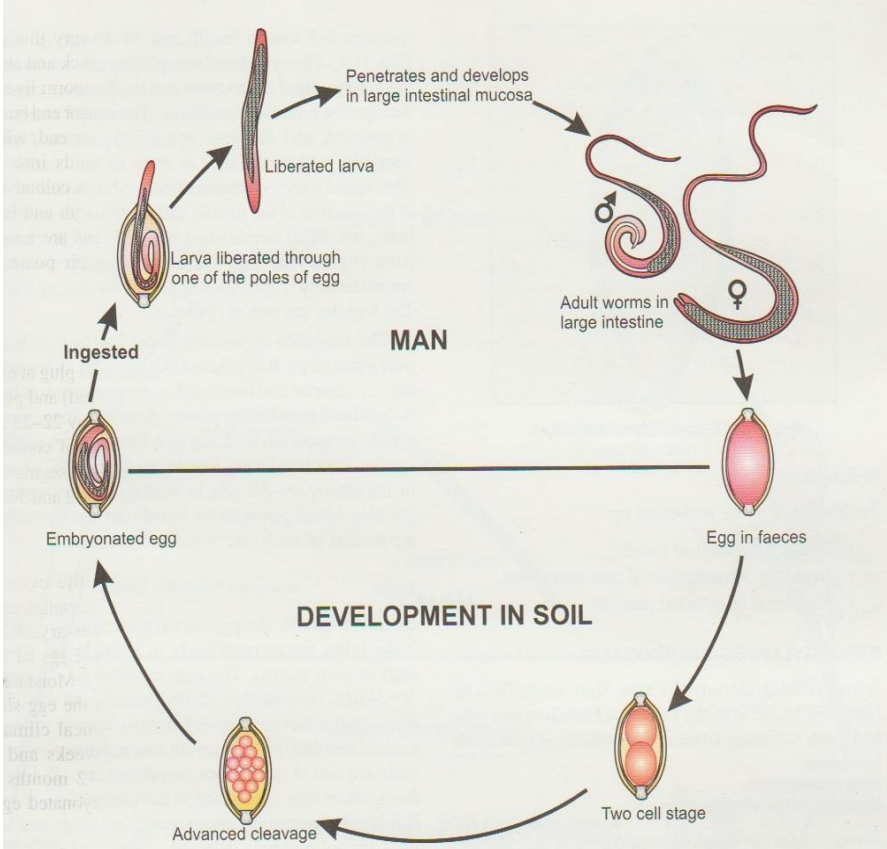

Fig. 11.2. Life cycle of *Trichuris trichiura*.

Life cycle of *Trichuris trichura*

Cestodes (Tapeworms)

1- cestodes are segmented dorsoventrally compressed and tape-like.

2- The body consist of three parts: scolex, neck and strobilla which composed or a chain of segments (immature, mature and gravid segments) .

3- there is no digestive system, nutrients are absorbed through the worms integument.

4- Excretory and nervous system are present .

5- most of cestodes complete their life cycle in two different hosts except *H. nana*
completes its life cycle in a single host . 1-*Taenia saginata*

Common name: Beef tape worm or unarmed tape worm.

Habitat: Adult worm lives in the small intestine (upper jejunum) of man, where it may survive for as long as 25 years. It causes intestinal infection, Taeniasis. It has worldwide distribution.

Morphology:

Adult worm measures 5-10 meters in length, Their body is divided into three regions;

1. Scolex: which is pyriform, it is equipped with suction apparatus, usually four cup- shape suckers, but no rostellum .

2. Neck: posterior to the scolex.

3. Stobilla: flat body consisting many segments, each segment is known as proglottids .

A-Immature segments

B- Mature segments

c- Gravid segments:contain uterus made up a medium stem with 15-30 lateral branches.

Egg: The eggs are spherical, brown in colour and surrounded by embryophore (6-hooked embryo), which is brown, thick-walled and radially striated.

Infective stage: Cysticercus bovis in muscle of cattles.
Diagnostic stage: Eggs in faeces or gravid segment.

Mode of infection: Man acquires infection by eating raw or under-cooked beef containing encysted larval stage(cysticercus bovis).

Pathogenecity:

Adult worm in the small intestine usually produce no symptoms, but at times, they may cause:

Vaque, Abdominal discomfort, diarrhea or diarrhea alternating constipation and weight loss.

Diagnosis:

Recovery of the gravid segments or the eggs from the stool.

Life cycle:

The adult worm lives in the small intestine of man. Gravid segments pass

out in the stool and become disintegrated and eggs come out to the soil. The gravid proglottid uterus contains about 100,000 eggs. The egg of *T. saginata* is spherical, the 6-hooked embryo is enclosed in a radially striated embryophore. Eggs are ingested by an intermediate host, cattle. The 6- hooked embryo escapes from its shell, penetrates through the intestinal wall into the blood vessels and is carried to the muscles where it develops into a larval stage, cysticercus bovis (inverted head and spherical body). Infection to man takes place by the ingestion of undercooked beef. In the small intestine of man, the head of the cysticercus gets invaginated and the body becomes segmented.

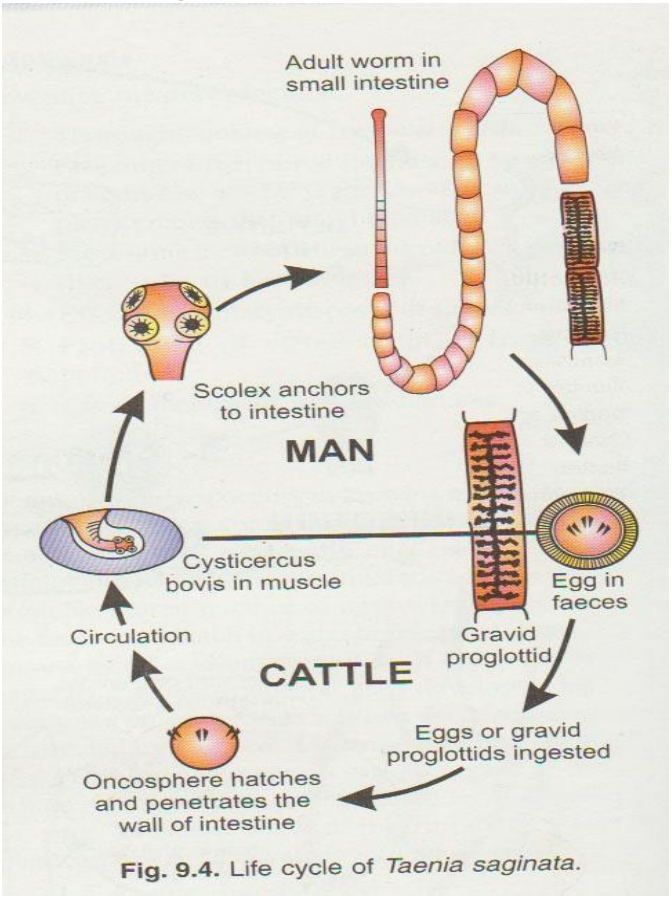

Fig. 9.4. Life cycle of *Taenia saginata*.

Life cycle of *Taenia saginata*

Treatment: Praziquantel is the choice drug for killing larvae and adult worm. 2-*Hymenolepis nana*

Common name*:* Dwarf tape worm.

Habitat: Adult worm lives in the small intestine of human.

Morphology

Adult worm measures 1-3 cm in length. It is made up of head (scolex), neck and segmented body. The head carries four suckers and a rostellum armed with one row of hooks. The segments of the body are divided into mature and gravid segments. In the mature segment, there are three testes in the middle, ovary consist of bilobes. Gravid segmentcnsist of sac- like uterus.

Egg : Egg is rounded, about 40 microns in diameter. It contains a six- hooked oncosphere within a rigid membrane (the embryosphere). This embryosphere has two polar thickening or knobs from which project 4-8 long, thin filaments called polar filaments.

Infective stage : Embryonated egg. Diagnostic stage: Eggs in faeces.

mode of infection:

Infection takes place by:

1. Ingestion of egg with contaminated raw vegetables.

2. Direyct infection from a patient

3. Auto infection: the eggs of H. nana are infective as soon as

they are passed with feces by the patient. If the hands of the

patient are contaminated by these eggs, she/he infects

herself/himself again and again.

Pathogenecity:

Light infections produce no symptoms. In fairly heavy infections, children may show lack of appetite, abdominal pain and diarrhea. Diagnosis: Demonstration of eggs in stool specimen by direct mic

Treatment :The drug of choice is praziquantel.

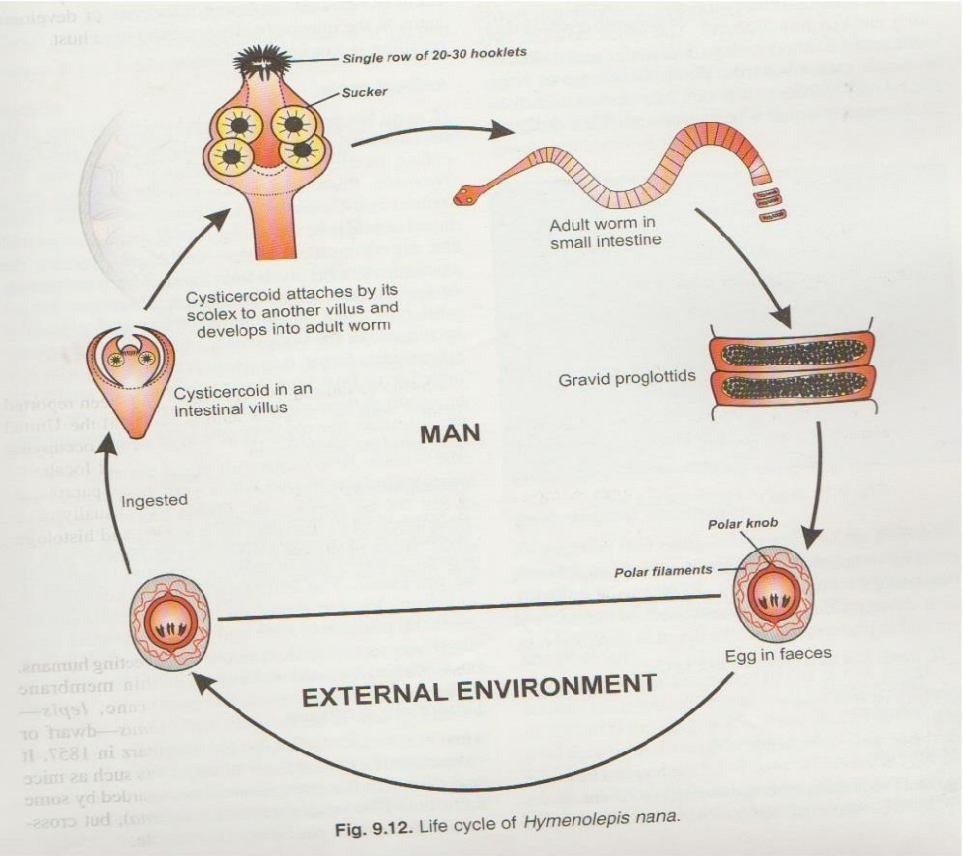

Fig. 9.12. Life cycle of *Hymenolepis nana*.

Life cycle of *Hymenolepis nana*